

A Remarkably Specialized New Cave Trechine (Coleoptera, Trechinae) from Northern Guangxi, South China

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Abstract A remarkably modified cave species of the trechine genus *Dongodytes* is described from a limestone cave of Tian'e Xian in northernmost Guangxi, South China. It is recognized at the first glance on the long slender fore body about as long as the hind body, and is named *Dongodytes giraffa* S. UENO, sp. nov.

The genus *Dongodytes* is a group of highly specialized trechine beetles hitherto known from two species found in two counties of Guangxi in South China. An aphaenopsoid trechine species recently discovered in a cave of Tian'e Xian in northernmost Guangxi seems to belong to this genus, but is strikingly different from the previously known members in the superordinary modification of the fore body. Besides, it is unique in such peculiarities as the presence of pronotal discal setae and of a third dorsal pore on the elytra, sharply serrate humeral margin, and the unmodified proximal segments of the male protarsi. It is, however, identical with the southern species in most diagnostic features, so that all the hypertrophied character states exhibited by the new species may have resulted secondarily from long adaptation to subterranean existence.

I am therefore going to regard the remarkable trechine as an extreme derivative of *Dongodytes* and to name it *Dongodytes giraffa* S. UENO. Of the nine caves investigated in Tian'e Xian and Nandan Xian in the autumn of 2004, only one cave called Bahao Dong located at the central part of Tian'e Xian was found inhabited by certain trechine, which turned out to be the most extraordinary species in the world. The abbreviations used herein are the same as those explained in previous papers of mine.

Before going further into details, I wish to express my hearty thanks to Dr. Yoshiaki NISHIKAWA and Dr. Shinzaburo SONE, both the most experienced biospeologists in Japan, for their help in field works. Deep gratitude should also be expressed to Mr. FAN Ting of the Academia Sinica and the authorities of Tian'e Xian for their kind arrangement and help of our cave investigations.

Dongodytes giraffa S. UENO, sp. nov.

(Figs. 1–3)

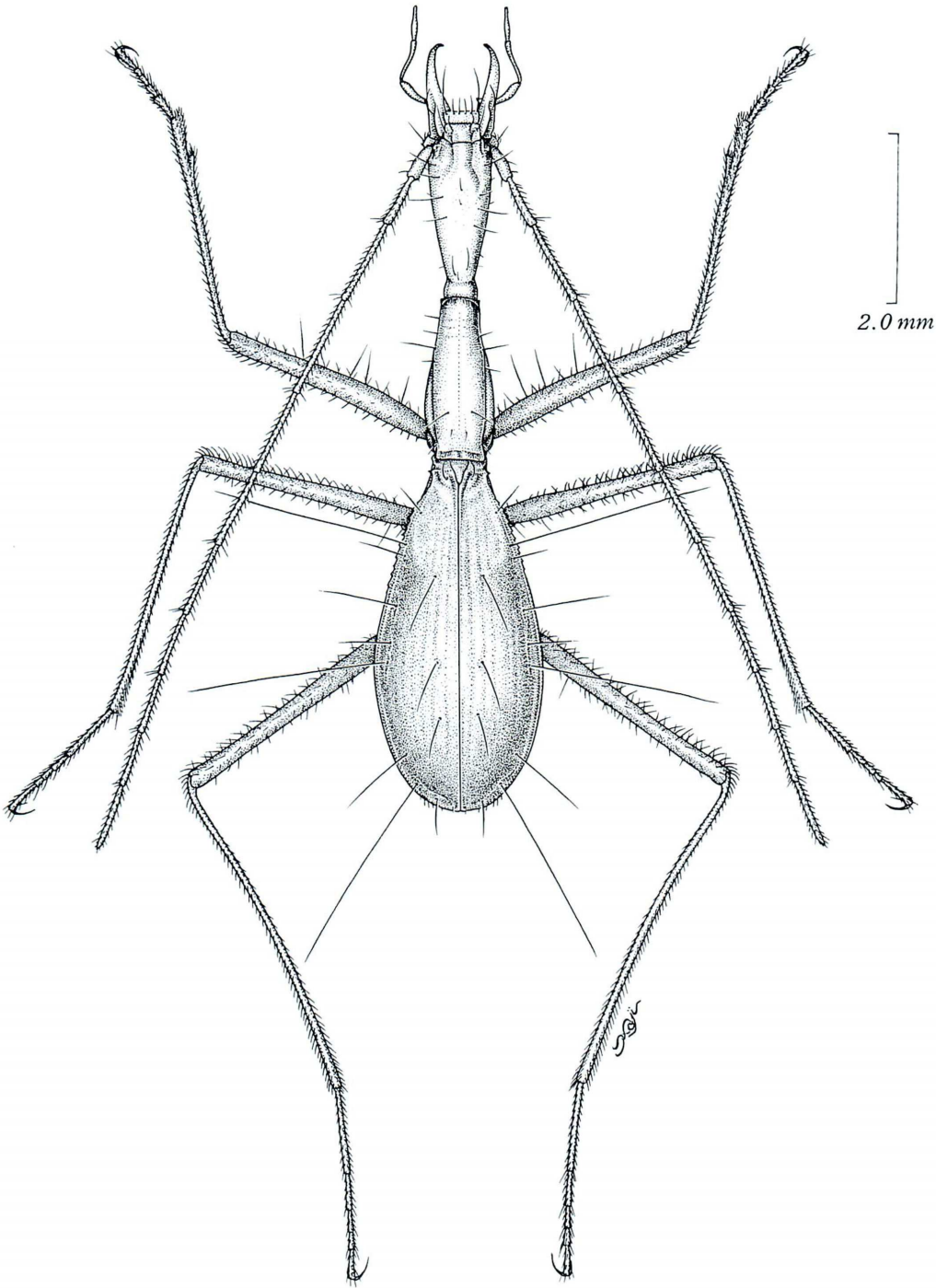
Length: 8.10 mm (from apical margin of clypeus to apices of elytra); 9.05 mm (including mandibles).

Recognized at the first glance on its long head, long and narrow prothorax with a pair of discal setae, distinctly serrate humeral borders of elytra, the presence of a third setiferous dorsal pore on the 3rd elytral stria, the absence of preapical pore, and the simple protarsomeres in the male. Body very long and slender, glabrous on pronotum and elytra but more or less hairy on the other parts; fore body about as long as hind body. Microsculpture consisting of fine transverse lines on head and pronotum though mostly obliterated on the former, mostly isodiametric or a little wide polygonal on elytra. Colour concolorously brown, partially a little reddish, shiny except for elytra which are subopaque; palpi pale.

Head very long, evidently longer than in the other congeners, HL/HW 2.82 (against 2.45–2.46 in the other species), HL/PL 1.07; sides almost straightly and gradually convergent posteriad; dorsum convex, obtusely carinate on frons, with two pair of supraorbital setae at the lateral parts in apical half; in the holotype, the posterior pair is supplemented on the left side with an extra seta; vertex with several, fairly long hairs, two of which may represent the remnants of a third pair of supraorbital setae; neck forming a distinct collar, neck constriction distinct, about a half as wide as the widest part at the anteriormost; frontal furrows deeply impressed and subparallel in anterior two-sevenths, briefly outcurved posteriad, and abruptly evanescent at about two-fifths from the clypeal apex; labrum transverse, with straight apical margin; mandibles slender, rather gently incurved at acute apices, right mandible bidentate; mentum concave, fused with submentum, mental tooth small and simple, submentum sexsetose; palpi long and slender, penultimate palpomere inwardly bisetose in labial palpus; antennae very long and slender, extending beyond elytral apices by one and two-thirds of apical antennomeres, scape the shortest though thicker than the others, pedicel short, about four-sevenths as long as segment 3, which is shorter than segment 4 and about as long as segment 5, segment 4 about 20 times as long as wide, segments 6–10 gradually decreasing in length towards apex, segment 10 slightly longer than pedicel, terminal segment relatively short, about as long as segment 8 and about 12 times as long as wide.

Prothorax very long and narrow, somewhat rod-like anteriorly, a little wider than head, about 2.3 times as long as wide, widest at about one-fourth from base, and much more gradually narrowed towards apex than towards base; PW/HW 1.14, PL/PW 2.33. Pronotum narrow, a little narrower than head, subparallel-sided behind middle, and gradually narrowed antieriad towards apex; PNW/HW 0.84, PL/PNW 3.16, PNW/PA 1.53, PNW/PB 1.04; lateral borders almost complete, sharply marked in basal halves

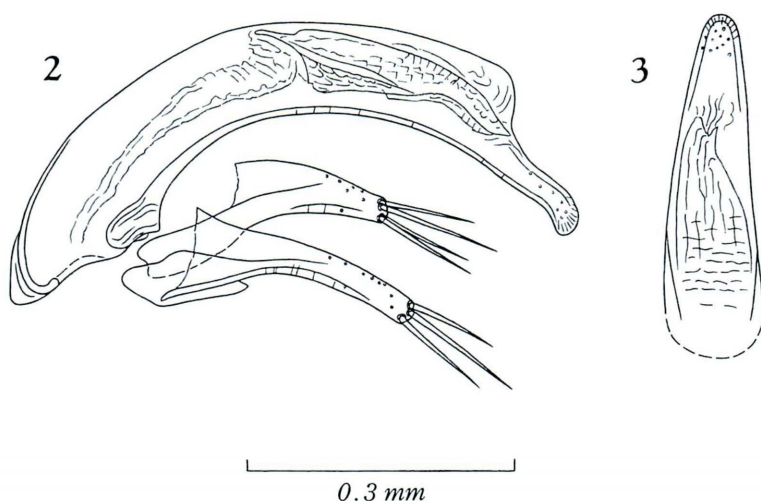
Fig. 1. *Dongodytes giraffa* S. UENO, sp. nov., ♂, from Bahao Dong Cave in Tian'e Xian, northern Guangxi.



but becoming uneven in front, and anteriorly connected with apical border, each with a shallow but distinct ante-basal sinuation at about basal tenth; marginal setae not regular, anterior pair distinct, located at about apical third but supplemented with a (sometimes two) weaker seta(e) both in front and behind, postangular setae much reduced, inserted at about the level of ante-basal sinuation; apex arcuate forwards and posteriorly rounded on each side; base evidently wider than apex, PB/PA 1.46, slightly emarginate at middle, and narrowly rounded on each side at hind angle; dorsum longitudinally convex, mostly glabrous though bearing a pair of discal setae at about basal three-tenths and a few short hairs behind them, with very fine but nearly entire median line somewhat deepened in basal area; apical transverse impression not sharply marked; basal transverse sulcus deep and continuous, laterally reaching hind angles; basal area rugulose; propleura laterally convex at the posterior parts and clearly visible in dorsal view from apical two-fifths to ante-basal sinuation of lateral borders, gradually convergent anteriorly but more rapidly so posteriorly. Scutellum small and narrow.

Elytra very similar in configuration to those of *D. grandis* S. UENO (1998, pp. 8, 12, figs. 3–5) from Yuanyang Dong Cave in Fengshan Xian, equally very long and narrow, very narrow at the bases, posteriorly dilated, widest at about five-ninths from bases, and rounded at the apical parts, but those of *D. giraffa* are much more convex, especially in apical two-thirds, with deeper basal foveae which are distinctly divided by a short sutural carina, and with sharply serrate humeral margins; EW/PW 2.41, EL/PL 2.12, EL/EW 2.04; sides narrowly bordered throughout, with extremely slight humeral angles and with sharp serration from basal peduncle to near the level of the proximal dorsal pore, then gently and widely arcuate, and conjointly rounded at apices; dorsum rather strongly convex, above all in apical two-thirds, steeply declivous at lateral and apical parts, distinctly foveate on each side in proximal three-tenths, and the foveae are proximally divided by a short obtuse carina protrudent from scutellar area; striae shallow even on the disc, degenerated at the side, stria 1 extremely close to suture in apical half, striae 7 and 8 evanescent; scutellar striole absent; apical striole vestigial; intervals glabrous and covered with coarse microsculpture, slightly convex only near suture, interval 1 very narrow and diminishing apically, interval 2 wide; stria 3 with three setiferous dorsal pores at about 2/7, 1/2 and 7/10 from base, respectively; preapical pore absent; marginal umbilicate pores identical in arrangement with those of *D. grandis*, including the unique isolated position of the fourth pore of the humeral set.

Ventral surface as in *D. grandis*, though the abdominal sternites are hairier. Legs very long and thin; protibiae nearly straight and briefly dilated only at the apical parts; metatibiae about as long as elytra and slightly outcurved. Tarsi very thin, protarsus about three-sevenths as long as protibia, mesotarsus about a half as long as mesotibia, and metatarsus about three-fifths as long as metatibia; tarsomere 1 about 1.5 times as long as tarsomeres 2–4 combined in mesotarsus, about 1.35 times as long as that in metatarsus; in ♂, protarsomeres not modified, neither denticulate inwards nor furnished beneath with adhesive appendages, though the protarsomere 1 is very slightly dilated, 3.5 times as long as wide, and a little longer than protarsomeres 2–3 combined,



Figs. 2–3. Male genitalia of *Dongodytes giraffa* S. UENO, sp. nov., from Bahao Dong Cave in Tian'e Xian, northern Guangxi; left lateral view (2), and apical part of aedeagus, dorso-apical view (3).

2 and 3 each twice as long as wide, and 4 only 1.4 times as long as wide.

Male genital organ exceedingly small and wholly transparent even in fully mature individual. Aedeagus only two-thirteenth as long as elytra, tubular, moderately arcuate from base to the base of apical lobe; basal part fairly elongate, with small basal orifice, whose sides are only slightly emarginate; sagittal aileron small though distinct; viewed dorsally, apical lobe nearly symmetrical, narrow, gradually tapered towards apex, which is narrowly rounded; viewed laterally, apical lobe abruptly and narrowly produced, slightly sinuate in proximal two-thirds, and decurved at the apical part, which is narrowly rounded at the extremity; ventral margin widely emarginate in profile. Inner sac armed with an elongate copulatory piece, which is nearly a half as long as aedeagus, somewhat spatulate, deeply sinuate on the left ventral margin, and largely covered with scales on the surface. Styles narrow, left style obviously longer than the right; in the holotype, right style bears four apical setae, while left style bears only three apical setae.

Female unknown.

Type specimen. Holotype: ♂, 11-X-2004, S. SONE leg. Deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Type locality. Limestone cave called Bahao Dong, 650 m in altitude, at Bahao of Gandong in Bala Xiang, Tian'e Xian, northern Guangxi, South China.

Notes. It is worth noting that hypertrophied cave trechines with unusually elongated fore body are met with only in a narrow zone from northwestern Guangxi in the west to southeastern Guizhou in the east. Their occurrence is always sporadical and usually difficult to ascertain because of the extreme rareness of the species involved.

As was delineated in a previous paper of mine, *Giraffaphaenops clarkei* DEUVE (2002, p. 520, fig. 4; UENO, 2003, p. 7, figs. 1–2, 4–7) occurs in several caves at the central part of Leye Xian, about 53 km distant to the west-southwest of the type locality of *Dongodytes giraffa*, and the intervening area between them, or more precisely, an isolated limestone area lying near the Tian'e border of Leye, harbours a cave trechine radically different from either of the highly modified species, which was recently described under the name *Bathytrechus rueci* S. UENO (2005).

A little more than 100 km east-northeast of the habitat of *Dongodytes giraffa*, there occur two species of *Uenotrechus*, which show a similar type of morphological modification though to a lesser extent (DEUVE & TIAN, in DEUVE, TIAN & RAN, 1999, p. 133, figs. 2, 6; UENO & RAN, 2001, p. 12, figs. 1–3; UENO, 2002, p. 400, figs. 1–3). *Dongodytes* itself extends its range towards the south; one of the two, previously known species, *D. grandis* S. UENO (1998, pp. 8, 12, figs. 3–5) occurs in a cave of Fengshan Xian, about 42 km south by west of Bahao Dong Cave in Tian'e Xian, and the other species, *D. fowleri* DEUVE (1993, p. 292, figs. 1–4; UENO, 1998, p. 8, figs. 1–2) occurs in a cave of Bama Xian about 25 km further south. Though highly specialized, these two species show a lesser degree of modification of the fore body than the Tian'e species *D. giraffa*. It is therefore apparent that the exceeding elongation of the fore body must have been developed by parallel evolution in the narrow zone along the southern edge of the Yungui Highlands, though it is difficult to elucidate at present why and how such a peculiar specialization has taken place in that particular area.

As was noted at the beginning of the description given above, *D. giraffa* is markedly different from the two southern congeners in several peculiarities. Beside those diagnostic characters, *D. giraffa* is unique in the transparency of its male genitalia. In trechine beetles, the male genitalia are always soft and transparent at the premature stage, even if the exoskeleton becomes already sclerotized. They become hardened in a week, or sometimes in two or three weeks, and turn dark or at least yellowish. The holotype of *D. giraffa* is fully mature in all respects; its genitalia are sufficiently hard though surprisingly small, and yet they are colourless and completely transparent. I have never seen similar examples in any other species of the Trechinae.

Bahao Dong Cave, the type locality of *D. giraffa*, is a large limestone cave lying at the central part of Tian'e Xian. It is open under a cliff of limestone about 20 m above a paddy field. The entrance is a kind of clerestory window of a huge entrance room, whose deep bottom can be reached by climbing down a steep boulder slope partly crusted with stoping flowstone. The single known specimen of *D. giraffa* was found leisurely walking in a hollow of such a flowstone about half way down the slope in the complete dark zone near the inner end of the entrance room. The upper part of the same slope is well decorated with stalagmites and flowstones but relatively dry, so were the inner parts of the main passage. We made careful systematic searches for additional specimens of the beetle, but all our efforts ended in vain.

要 約

上野俊一：中国广西壮族自治区の最北部で見つかった新型のキリンメクラチビゴミムシ。——中国南部の广西壮族自治区のうちで、最北部に位置する天峨県の大きい石灰洞から、形態的な特殊化が極限まで進んだアシナガメクラチビゴミムシの一種を新たに記載した。隣接する乐业県から知られるキリンメクラチビゴミムシ *Giraffaphaenops clarkei* と同じように、体前部がいちじるしく伸長して上翅と等長になり、触角や肢も極端に細長く変形しているが、乐业のものとは系統的に異なり、南隣りの凤山县と巴马县とから見つかった *Dongodytes* 属の種に共通する点が多い。それでこの珍奇なメクラチビゴミムシに、*Dongodytes giraffa* S. UENO という新名を与えた。真のキリンメクラチビゴミムシとの類似は、明らかに並行進化の産物であるが、このように極端な特化を遂げた種類が、メクラチビゴミムシ類の分布域の南限付近のみに出現するのは、洞窟生物学的にみてたいへん興味深い事実である。

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